

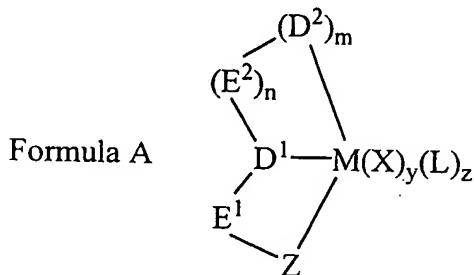
**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-34 (cancelled).

35 (currently amended). A polymerisation catalyst comprising

- (1) a transition metal compound having the following Formula A, and optionally
- (2) an activating quantity of a suitable activator,



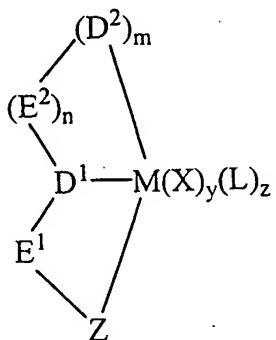
wherein Z comprises a five-membered heterocyclic group, the five membered heterocyclic group containing at least one carbon atom, at least one nitrogen atom and at least one other hetero atom selected from the group consisting of nitrogen, sulphur and oxygen, the remaining atoms in said ring being selected from the group consisting of nitrogen and carbon; M is a metal from Group 3 to 7 of the Periodic Table or a lanthanide metal; E<sup>1</sup> and E<sup>2</sup> are divalent groups independently selected from the group consisting of (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups and (vi)

heterosubstituted derivatives of said groups (i) to (v);  $D^1$  and  $D^2$  are donor atoms or groups; the divalent groups  $E^1$  and  $E^2$  are not linked other than through the donor atom or group  $D^1$ ;  $X$  is an anionic group,  $L$  is a neutral donor group;  $n = m =$  zero or 1;  $y$  and  $z$  are independently zero or integers such that the number of  $X$  and  $L$  groups satisfy the valency and oxidation state of the metal  $M$ .

36 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein the five membered heterocyclic group contains at least 3 carbon atoms in its ring.

37 (currently amended). A polymerisation catalyst as claimed in claim 35 comprising

- (1) a transition metal compound having the following Formula A, and optionally
- (2) an activating quantity of a suitable activator,



Formula A

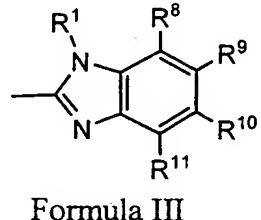
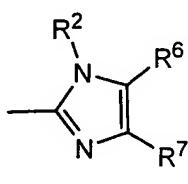
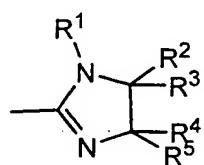
wherein  $Z$  is specifically an imidazole-containing group;  $M$  is a metal from Group 3 to 7 of the Periodic Table or a lanthanide metal;  $E^1$  and  $E^2$  are divalent groups

independently selected from the group consisting of (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups and (vi) heterosubstituted derivatives of said groups (i) to (v); D<sup>1</sup> and D<sup>2</sup> are donor groups; the divalent groups E<sup>1</sup> and E<sup>2</sup> are not linked other than through the donor atom or group D<sup>1</sup>; X is an anionic group, L is a neutral donor group; n = m = zero or 1; y and z are independently zero or integers such that the number of X and L groups satisfy the valency and oxidation state of the metal M.

38 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein D<sup>1</sup> and / or D<sup>2</sup> are an imidazole-containing group.

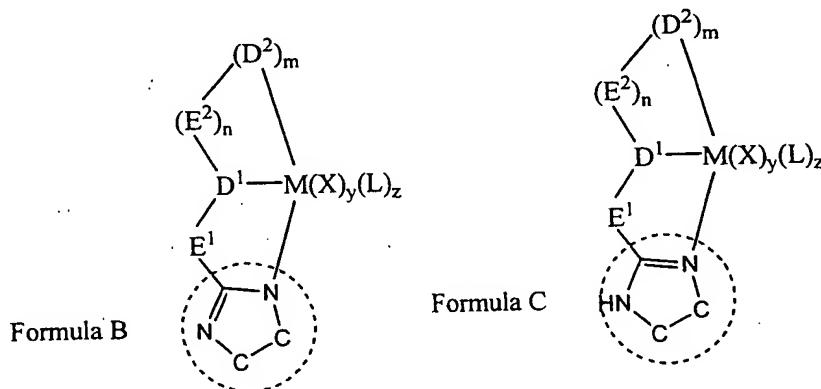
39 (previously presented). A polymerisation catalyst as claimed in claim 37 wherein D<sup>2</sup> and Z are identical imidazole containing groups.

40 (previously presented). A polymerisation catalyst as claimed in claim 37 wherein the imidazole-containing group Z is selected from a group of the group consisting of Formula I, II or and III

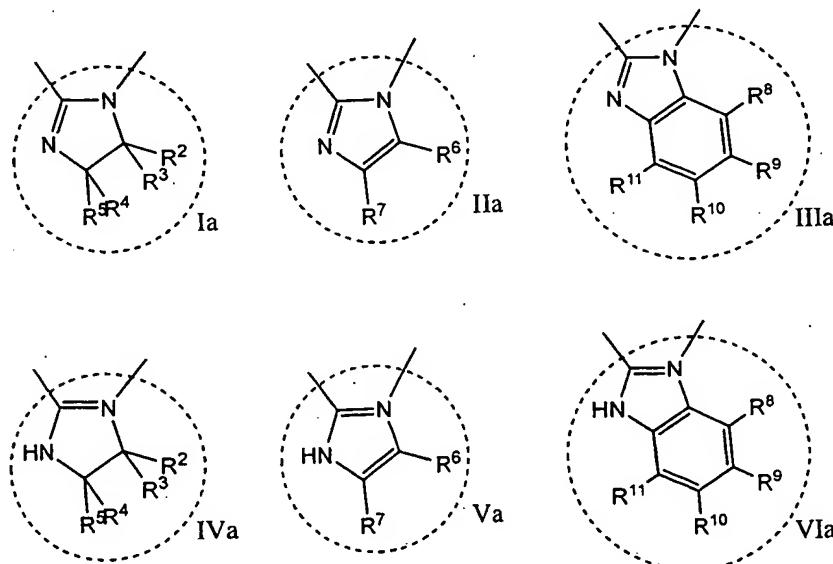


$R^1$  to  $R^{11}$  are independently hydrogen or a monovalent (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups, (vi) heterosubstituted derivatives of said groups (i) to (v), and or (vii) hydrocarbyl-substituted heteroatom groups.

41 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein the transition metal compound has the following Formula B or C



wherein the imidazole nucleus shown within the dotted circle is selected from the group consisting of the divalent groups represented by the Formulae Ia, IIa, IIIa, IVa, Va and VIa,



wherein M is a metal from Group 3 to 7 of the Periodic Table or a lanthanide metal; E<sup>1</sup> and E<sup>2</sup> are divalent groups independently selected from the group consisting of (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups and (vi) heterosubstituted derivatives of said groups (i) to (v); D<sup>1</sup> and D<sup>2</sup> are donor groups; the divalent groups E<sup>1</sup> and E<sup>2</sup> are not linked other than through the donor atom or group D<sup>1</sup>; X is an anionic group, L is a neutral donor group; n = m = zero or 1; y and z are independently zero or integers such that the number of X and L groups satisfy the valency and oxidation state of the metal M, wherein the groups R<sup>2</sup> to R<sup>11</sup> are independently hydrogen or a monovalent (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups, (vi) heterosubstituted derivatives of said groups (i) to (v), and or (vii) hydrocarbyl-substituted heteroatom groups.

42 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein E<sup>1</sup> and E<sup>2</sup> are independently selected from the group consisting of -CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>-, -CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>-, 1,2-phenylene, *trans*-1,2-cyclopentane, *trans*-1,2-cyclohexane, 2,3-butane, 1,1'-biphenyl, 1,1'-binaphthyl, and -Si(Me)<sub>2</sub>-.

43 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein D<sup>1</sup> and D<sup>2</sup> are selected from the group consisting of oxygen, sulfur, an amine of

formula -N(R<sup>12</sup>)- or and a phosphine of formula -P(R<sup>13</sup>)- wherein R<sup>12</sup> and R<sup>13</sup> are hydrogen or (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups, (vi) heterosubstituted derivatives of said groups (i) to (v), (vii) hydrocarbyl-substituted heteroatom groups and or (viii) an imidazole-containing group.

44 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein M is selected from the group consisting of Sc, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo and W.

45 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein the anionic group X is selected from the group consisting of a halide, a hydrocarbyl group, a carboxylate, an oxide; an amide; an alkoxide; an acetylacetone; and a hydroxyl.

46 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein X is a non-coordinating or weakly-coordinating anion.

47 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein the neutral donor group L is selected from the group consisting of an ether, an amine, a phosphine, an olefin, water, and a neutral diene, a conjugated diene or and a nonconjugated diene.

48 (currently amended). A polymerisation catalyst as claimed in claim 35

wherein the optional activator (2) is selected from the group consisting of organoaluminium compounds, and organoboron compounds, and mixtures thereof.

49 (currently amended). A polymerisation catalyst as claimed in claim 48

wherein the optional activator (2) is selected from the group consisting of trimethylaluminium, triethylaluminium, tributylaluminium, tri-octylaluminium, ethylaluminium dichloride, diethylaluminium chloride, tris(pentafluorophenyl)aluminium, alumoxanes, dimethylphenylammoniumtetra(phenyl)borate, trityltetra(phenyl)borate, triphenylboron, dimethylphenylammonium tetra(pentafluorophenyl)borate, sodium tetrakis[(bis-3,5-trifluoromethyl)phenyl]borate,  $H^+(OEt_2)[(bis-3,5-trifluoromethyl)phenyl]borate$ , trityltetra(pentafluorophenyl)borate and tris(pentafluorophenyl) boron.

50 (currently amended). A polymerisation catalyst as claimed in claim 35

wherein the optional activator is provided by a Lewis acid selected from the group consisting of

- (a) ionic-bonding compounds having a  $CdCl_2$  type or a  $CdI_2$  type of layered crystal structure;
- (b) clays, clay minerals, or ion-exchange layered compounds;
- (c) heteropoly-compounds; and
- (d) halogenated lanthanoid compounds.

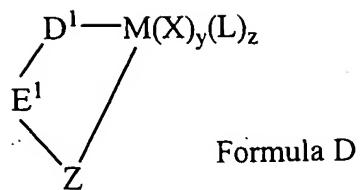
51 (currently amended). A polymerisation polymerisation catalyst as claimed in claim 35 wherein the optional activator is provided by a catalyst support-activator agglomerate comprising a composite of (A) at least one inorganic oxide component selected from the group consisting of  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{AlPO}_4$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ , and  $\text{Cr}_2\text{O}_3$  and (B) at least one ion containing layered material comprising a smectite.

52 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein there is present a promoter comprising a halogenated organic compound.

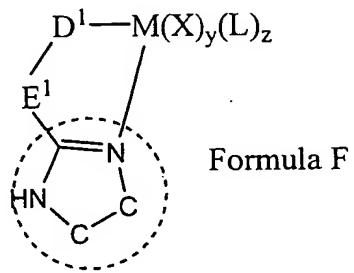
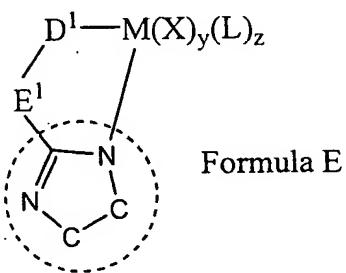
53 (currently amended). A polymerisation catalyst as claimed in claim 52 wherein the promoter is selected from the group consisting of carbon tetrachloride, hexachloroethylene, benzylbromide, benzylchloride, ethyl trichloroacetate and 2,3- or 1,3-dichloropropylene, chloroform ( $\text{CHCl}_3$ ) and n-butylchloride.

54 (previously presented). A polymerisation catalyst as claimed in claim 53 wherein the transition metal is vanadium.

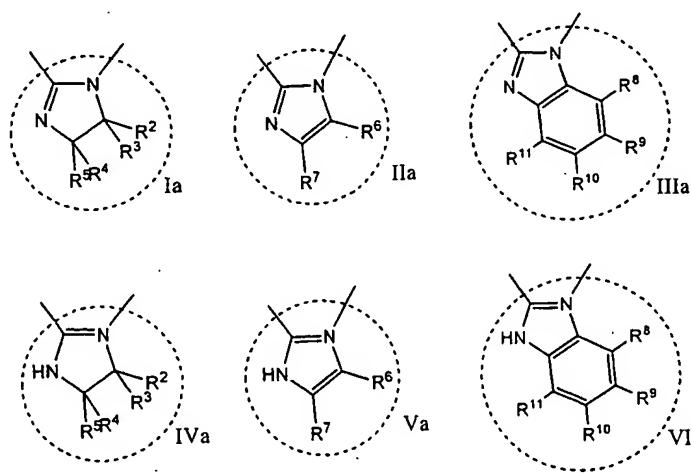
55 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein m and n are zero in Formula A so that the transition metal compound is of Formula D



56 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein m and n are zero in Formula A so that the transition metal compound is of Formula E or Formula F



and wherein the imidazole nucleus within the dotted circle is selected from the group consisting of divalent groups represented by the Formulae Ia, IIa, IIIa, IVa, Va and VIa as follows:



57 (previously presented). A polymerisation catalyst as claimed in claim 35 wherein in addition to the defined catalyst there is present one or more other catalysts for polymerising 1-olefins.

58 (currently amended). A polymerisation catalyst as claimed in claim 35 wherein in addition to the defined catalyst there is present one or more other transition metal catalysts selected from the group consisting of Ziegler-Natta catalyst systems, metallocene-based catalysts, or and heat activated supported chromium oxide catalysts.

59 (previously presented). A supported catalyst comprising the polymerisation catalyst defined in claim 35 and a support material.

60 (previously presented). A process for the polymerisation and copolymerisation of 1-olefins, cycloolefins or dienes, comprising contacting the monomeric olefin under polymerisation conditions with the polymerisation catalyst claimed in claim 35.

61 (currently amended). A process as claimed in claim 60 wherein the process is for the homopolymerisation of 1-olefins and wherein the monomer is selected from the group consisting of ethylene, propylene, butene, hexene, and styrene.

62 (currently amended). A process as claimed in claim 60 wherein the process

is for the copolymerisation of 1-olefins and wherein the monomer is selected from the group consisting of ethylene, propylene, 1-butene, 1-hexene, 4-methylpentene-1, octane, methyl methacrylate, methyl acrylate, butyl acrylate, acrylonitrile, vinyl acetate, vinyl chloride, and styrene.

63 (currently amended). A process as claimed in claim 60 comprising the copolymerisation of ethylene and or propylene with comonomers selected from the group consisting of 1-butene, 1-hexene, 4-methylpentene-1, methyl methacrylate, methyl acrylate, butyl acrylate, acrylonitrile, vinyl acetate, and styrene, diene, cyclic olefin, norbornene norbornene and substituted norbornene norbornene.

64 (currently amended). A process as claimed in claim 60 wherein the catalyst is supported on a support material selected from the group consisting of silica, alumina, zirconia, talc, kieselguhr, magnesia, magnesium chloride and polymers.

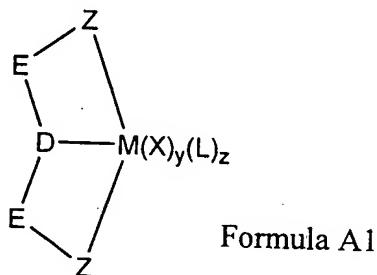
65 (previously presented). A process as claimed in claim 60 wherein the process is carried out under gas phase, slurry phase or solution phase polymerisation conditions.

66 (previously presented). A process as claimed in claim 60 wherein the process is carried in the presence of hydrogen gas to modify the average molecular weight of the produced polymer.

67 (previously presented). A process for oligomerisation and cooligomerisation of 1-olefins, comprising contacting the monomeric olefin under oligomerisation conditions with the catalyst claimed in claim 35.

68 (currently amended). A polymerisation catalyst comprising

(1) a transition metal compound having the following Formula A1,



and optionally (2) an activating quantity of a suitable activator,

wherein Z is specifically an imidazole-containing group; M is a metal from Group 3 to 7 of the Periodic Table or a lanthanide metal; B is a divalent group independently selected from the group consisting of (i) aliphatic hydrocarbon, (ii) alicyclic hydrocarbon, (iii) aromatic hydrocarbon, (iv) alkyl substituted aromatic hydrocarbon (v) heterocyclic groups and (vi) heterosubstituted derivatives of said groups (i) to (v); D is a donor group; the divalent groups E are not linked other than through the donor group D; X is an anionic group, L is a neutral donor group; y and z are independently zero or integers such that the number of X and L groups satisfy the valency and oxidation state of the metal M.